IN THE CLAIMS:

1. (Original) A current monitoring system comprising:

a conductive path configured to receive a current therethrough;

a first current sensor positioned on a first side of the conductive path and configured to monitor a first directional magnetic field induced by the current;

a second current sensor positioned on a second side of the conductive path, substantially opposite the first current sensor, and configured to monitor a second directional magnetic field induced by the current that is substantially opposite in direction to the first directional magnetic field; and

a processing component configured to receive feedback from the first current sensor and the second current sensor and generate an anti-differential output from the feedback.

2. (Original) The system of claim 1 wherein the processing component includes at least one of a summing amplifier and a differential amplifier.

3. (Original) The system of claim 1 wherein the first current sensor includes a first Hall effect sensor and the second current sensor includes a second Hall effect sensor.

4. (Original) The system of claim 3 wherein the first Hall effect sensor is configured to generate a first feedback upon detecting the first directional magnetic field induced by the current through the conductive path and the second Hall effect sensor is configured to generate a second feedback upon detecting the second directional magnetic field induced by the current through the conductive path.

5. (Original) The system of claim 4 wherein the first feedback generated by the first Hall effect sensor includes an indication of another current upon detecting a directional magnetic field induced externally to the conductive path and the second feedback generated by the second Hall effect sensor includes an indication of another current upon detecting the directional magnetic field induced externally to the conductive path.

6. (Original) The system of claim 5 further comprising generating the anti-differential output from the first feedback and the second feedback to reduce the indication of the another current.

7. (Original) The system of claim 3 wherein the anti-differential output is substantially free of variations due to changes in operating temperatures of the first Hall effect detector and the second Hall effect detector and substantially free of variations due to hysteresis, magnetic core saturation, and eddy currents.

8. (Original) The system of claim 3 further comprising a constant current power supply having at least one of a bias current compensation circuit and a temperature dependent adjustable gain configured to compensate for Hall gain drift and wherein the processing component includes a temperature dependant op-amp gain loop configured to compensate for temperature dependent electronic drift.

9. (Original) The system of claim 1 wherein the first current sensor and the second current sensor are substantially free of ferromagnetic field concentrating materials.

10. (Original) The system of claim 1 further comprising an adjacent conductive path positioned proximate to the conductive path and having a current flow therethrough.

11. (Original) The system of claim 10 wherein the first current sensor, the second sensor, and the processing component are configured to perform common mode error correcting to substantially eliminate feedback attributable to the adjacent conductive path from the anti-differential output.

12. (Original) A current sensor comprising:

a first Hall effect sensor positioned proximate to a conductor and configured to provide a first feedback indicative of a current flow through the conductor;

a second Hall effect sensor positioned proximate to the conductor and configured to provide a second feedback indicative of the current flow through the conductor; and

a processing device configured to generate a summed difference of the first feedback and the second feedback to reduce feedback corresponding to magnetic fields induced externally from the conductor.

13. (Original) The current sensor of claim 12 wherein the first Hall effect sensor is positioned on a first side of the conductor and the second Hall effect sensor is positioned on a second side of the conductor, wherein the first side of the conductor is substantially opposite the second side of the conductor.

14. (Original) The current sensor of claim 12 wherein the first Hall effect sensor is configured to provide feedback having a first polarity upon detecting magnetic fields induced by current flow through the conductor and the second Hall effect sensor is configured to provide feedback having a second polarity upon detecting magnetic fields induced by current flow through the conductor.

15. (Original) The current sensor of claim 14 wherein the first Hall effect sensor and the second Hall effect sensor are configured to provide feedback having the first polarity upon detecting magnetic fields induced externally from the conductor.

16. (Original) The current sensor of claim 15 wherein the processing component includes a differential amplifier configured to sum the difference of the feedback having the first polarity and the feedback having the second polarity to substantially remove feedback generated upon detecting magnetic fields induced externally from the conductor.

17. (Original) The current sensor of claim 12 wherein the processing component includes an amplifier configured to calculate at least one of a sum and a difference of the first feedback and the second feedback to generate the summed difference.

18. (Original) The current sensor of claim 12 further comprising a constant current power supply having at least one of a bias current compensation circuit and a temperature dependent adjustable gain configured to compensate for Hall gain drift.

19. (Original) The current sensor of claim 12 wherein the summed difference is substantially free of variations due to changes in operating temperatures of the first Hall effect detector and the second Hall effect detector.

20. (Original) The current sensor of claim 12 wherein the current sensor is substantially free of ferromagnetic core materials.

21. (Original) The current sensor of claim 12 wherein the summed difference is substantially free of variations due to hysteresis, magnetic core saturation, and eddy currents.

22. (Original) The current sensor of claim 12 wherein the summed difference is zero when no current flow is present through the conductor.

23. (Original) A method of determining current flow through an electrical path comprising the steps of:

generating a first feedback represented by a first vector having a first direction and a first magnitude upon detecting a first direction of magnetic flux induced by a current flow through an electrical path and a second vector having the first direction and a second magnitude upon detecting a second direction of magnetic flux induced externally from the electrical path;

generating a second feedback represented by a third vector having the first direction and the first magnitude upon detecting a third direction of magnetic flux induced by the current flow through the electrical path and a fourth vector having a second direction and the second magnitude upon detecting the second direction of magnetic flux induced externally from the electrical path; and

summing the first feedback and the second feedback to create an anti-differential sum thereby substantially canceling the effects of the first feedback and the second feedback represented by the second vector and the fourth vector.

24. (Original) The method of claim 23 further comprising the step of correcting for Lorentz force drifts associated with temperature variations by providing a temperature dependent supply of power to a sensor system configured to generate the first feedback and the second feedback.

25. (Original) The method of claim 23 further comprising the step of correcting for electronic drift associated with temperature variations.

26. (Original) The method of claim 23 wherein the first direction of magnetic flux and the third direction of magnetic flux are substantially opposite.

27. (Original) The method of claim 23 wherein the steps of generating the first feedback and generating the second feedback include monitoring the electrical path includes monitoring at least one of a conductive wire, a bus bar, and an integrated circuit (IC) board etching to determine the first, second and third directions of magnetic flux.

28. (Original) The method of claim 23 wherein the steps of generating the first feedback and generating the second feedback further comprises receiving feedback from at least two Hall sensors configured to detect oppositely directed magnetic flux induced by current flow through the electrical path to generate the first feedback and the second feedback.

29. (Original) The method of claim 28 further comprising compensating for a Hall voltage zero flux offset by matching the at least two Hall sensors.

30. (Original) The method of claim 28 further comprising removing phase shifts such that the anti-differential sum is in phase with current flow through the electrical path.

31. (Original) An anti-differential current sensing system comprising:

an electrically conductive path;

a first Hall effect sensor disposed proximate to a first side of the electrically conductive path and configured to generate a first measure of a current flow through the electrically conductive path by monitoring magnetic fields;

a second Hall effect sensor disposed proximate to a second side of the electrically conductive path, substantially opposite the first side of the electrically conductive path, and configured to generate a second measure of the current flow through the electrically conductive path by monitoring magnetic fields; and

a processing device configured to receive the first measure of the current flow and the second measure of the current flow and generate an output from the first measure of the current flow and the second measure of the current flow substantially free of errors due to magnetic fields generated externally from the conductive path.

32. (Original) The system of claim 31 wherein the processing device includes at least one of a summing amplifier and a differential amplifier configured to reduce the first measure of the current and the second measure of the current by an amount attributable to magnetic fields induced externally to the electrically conductive path.

33. (Original) The system of claim 32 wherein the processing device includes an op-amp.

34. (Original) The system of claim 31 wherein the first Hall effect sensor and the second Hall effect sensor are positioned about a periphery of the electrically conductive path.

35. (Original) The system of claim 31 wherein the current flow through the electrically conductive path includes at least one of a direct current (DC) and an alternating current (AC).

36. (Original) The system of claim 35 wherein the current flow includes a frequency of greater than 30kHz.

37. (Original) The system of claim 31 further comprising a second electrically conductive path proximate the electrically conductive path.

38. (Original) The system of claim 37 wherein the electrically conductive path and the second electrically conductive path include a wire having a first radius and a second radius, respectively.

39. (Original) The system of claim 38 wherein the electrically conductive path and the second electrically conductive path are disposed at a distance separating the electrically conductive path and the second electrically conductive path by approximately three times a greater of the first radius and the second radius to provide a buffer for common mode error correcting.

40. (Original) The system of claim 39 wherein the buffer is configured such that a summed difference of the first measure of the current flow through the electrically conductive

path and the second measure of the current flow through the electrically conductive path includes an error of not greater than 1%.

41. (Original) The system of claim 37 wherein the electrically conductive path and the second electrically conductive path each include a bus bar and wherein the bus bars are disposed at a distance of approximately one-and-one half times a width of the bus bars.

42. (Original) The system of claim 41 wherein the buffer is configured such that a summed difference of the first measure of the current flow through the electrically conductive path and the second measure of the current flow through the electrically conductive path includes an error of not greater than 1%.

43. (Original) The system of claim 31 wherein a summed difference of the first measure of the current flow and the second measure of the current flow is substantially free of variations due to hysteresis, magnetic core saturation, and eddy currents.

44. (Original) The system of claim 31 wherein the first current sensor and the second current sensor are matched to provide feedback such that a summed difference of the first measure of the current flow and the second measure of the current flow is zero when no current flow is present through the electrically conductive path.

45. (Original) A current sensor system comprising:

means for carrying current;

means for generating a first feedback upon detecting magnetic flux in a first direction induced from the means for carrying current;

means for generating a second feedback upon detecting magnetic flux in a second direction induced from the means for carrying current, wherein the first direction is substantially opposite the direction; and

means for generating an anti-differential sum from the first feedback and the second feedback to reduce feedback generated upon detecting stray magnetic flux.